

Brookhaven National Laboratory National Synchrotron Light Source			Number: LS-SDL-0014	Revision: B
			Effective: 7/25/2006	Page 1 of 4
Subject: SDL Laser Safety Procedure				
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I. PURPOSE

This procedure is used as part of the training for operation of the lasers listed in this document. Any changes in lasers or scope of operations require an amendment or revision of this procedure, approved by the project manager and the laser safety officer. New users may be added to the list of authorized personnel by the project manager, provided they have completed the training and medical examination requirements for laser users.

II SCOPE OF WORK AUTHORIZED

The laser systems for the SDL are used as an integral part of the facility and its research program. The tasks they accomplish range from beam alignment and survey to providing pump or probe beams to stimulate photoemission from the electron gun cathode or for the characterization of the electron or photon beams produced by the accelerator. This work requires the routine operation, alignment and maintenance of the class IV lasers listed in Section III. Procedures for basic alignment, operation, and maintenance are detailed in the laser manuals. Additional alignment and operation procedures are described in laser logbooks or as separate documents written by the system responsible person.

III LASER DESCRIPTION

The table on the following page outlines the properties of the lasers used in the facility. No class 3B or 4 lasers may be operated in this lab unless listed in this document.

No. System Name										
7	Alignment Diode Laser									
6	Various He:Ne Alignment Lasers									
5	Positive Light TSA-50 Ti:Sapp Regen									
4	Spectra Physics Tsunami Ti:Sapp									
3	Spectra Physics Millennia Nd:YVO4									
2	Quanta-Ray GCR 170-10									
1	Quanta-Ray GCR 150-10									
Laser Parameters		Units								
ANSI Z136.1 Class		IV	IV	IV	IV	IV	IV	IV	IIlb	IIla
Wavelength		[nm]	1064	532	1064	532	~800	~800	632	780
CW System						x			x	x
Average Power		[W]				5	1.25		0.01	0.005
Pulsed System			x	x	x	x	x	x		
Pulse Energy		[mJ]	1500	650	1700	850	16 nJ	50		
Pulse Duration		[ps]	6000	6000	6000	6000	~0.1	0.1-6		
Repetition Rate		[Hz]	10	10	10	10	80 MHz	10		

IV PERSONNEL AUTHORIZED TO USE SDL LASERS

A list of qualified personnel is posted at the SDL laser room and is maintained by the NSLS training coordinator.

V EYE PROTECTION

Eye protection appropriate to the beam in use (see table) must be worn by all personnel within the SDL Laser Room whenever there is an unenclosed beam with power >5 mW.

In the context of the SDL lasers systems, these guidelines result in the following specific laser work rules:

1. Laser goggles are required for all alignment work on the Class IV lasers. The OD of the goggles must be appropriate to the wavelength (s) emitted. See Table below.
2. Laser goggles are required for aligning Class IV laser beams outside the confines of the lasers themselves, e.g., on laser table or into the experimental apparatus. The OD of the goggles must be appropriate to the wavelength (s) emitted. See Table below.
3. Following a new laser beam set-up or change in alignment, a survey will be conducted to verify that all unwanted beams and reflections have been properly terminated. Opaque barriers will be used to minimize exposure to low intensity stray reflections and scatter. Only after such a beam survey can normal eye-protection,(i.e., laboratory safety glasses with side-shields or plastic goggles), be used during laser experiments.
4. Beam tubes will be used to enclose laser beams that move off the laser tables and cross walkway areas.

No. System Name								
5	Positive Light TSA-50 Ti:Sapp Regen							
4	Spectra Physics Tsunami Ti:Sapp							
3	Spectra Physics Millenia Nd:YVO4							
	Quanta-Ray GCR 170-10							
1	Quanta-Ray GCR 150-10							
Laser & Eyewear Parameters								
ANSI Z136.1 Class	IV	IV	I	IV	IV	IV	IV	
Wavelength [nm]	1064	532	1064	532	532	~800	~800	
<i>Intra-Beam OD Required</i>								
0.25 s		6.7		6.7	3.7			
10 s	6.4		6.4			3.3	5.7	
600 s Diffuse Reflection	3.4	4.1	3.4	4.1	2.4	0.23	2.64	
<i>Nominal Hazard Zone [m]</i>	9.8	22	9.8	22	3.1	0.26	4.18	

VI SKIN PROTECTION:

The **Positive Light TSA-50 Ti:Sapphire regenerative laser** can generate incidental UV light in excess of the MPE. During operation of this laser with any open beam path, all personnel within the SDL laser room are to minimize the risk of exposure by wearing long sleeved shirts or a lab coat.

VII BEAM/TARGET INTERACTION HAZARDS:

No beam/target interaction hazards are present in these experiments. High intensity beams will be absorbed with appropriate beam dumps.

VIII MISCELLANEOUS HAZARDS:

N/A

IX ELECTRICAL HAZARDS:

Note that work on or near live electrical circuits may only be performed when the requirements of the Department Practices for Working Alone, Electrical Safety Related Work Practices, and Lockout/Tagout are met.

All electronic and electrical equipment is grounded in a manner compliant with the National Electrical Code and operated in a manner such that there is no electrical hazard during normal operation. The lasers can present a danger because of stored energy in the circuitry, and repairs involving high voltage components are performed by qualified service personnel on site or at the factory.

Document Review Frequency	
3	Years

Review signatures on file with master copy of controlled document

NSLS REVISION LOG		
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A	First Issue	7/15/03
B	Clarified eye and UV light protection requirements	7/25/06